Midterm Review

coverage

everything in slides & homework through Feb 2 and text chapters 1-5 is included, except as noted below.

mechanics

closed book, closed notes

i'm more interested in setup and method than in numerical answers, so concentrate on giving a clear approach, perhaps including a terse english outline of your reasoning.

corollary: calculators are probably irrelevant, but bring one to the exam if you want, just in case.

exclude 1.6

product rule

permutations

combinations

binomial coefficients

binomial theorem

multinomial coefficients

exclude 2.6

sample spaces & events

axioms

complements, Venn diagrams, deMorgan, mutually exclusive events, etc.

equally likely outcomes

chapter 3: conditional probability and independence

exclude pp87-92 except for gambler's ruin example

conditional probability

chain rule

bayes rule yes, learn the formula

odds

independence

exclude 4.7 ex 7d, parts of 4.8 not noted below

discrete random variables

probability mass function (pmf)

expectation of X

expectation of g(X) (i.e., a function of an r.v.)

expectation of X+Y and linearity

variance

cumulative distribution function (cdf)

- cdf as sum of pmf from -∞

important examples: know pmf, mean, variance of these

- bernoulli, binomial, poisson, geometric (4.8.1), hypergeom (4.8.3)

exclude 5.5.1, 5.6

probability density function (pdf)

cdf as integral of pdf from $-\infty$

expectation and variance

distribution g(X)

important examples know pdf and/or cdf, mean, variance of these

uniform, normal (incl Φ, "standardization"), exponential

Calculus is a prereq, but I'd suggest the most important parts to brush up on are:

taylor's series for e^x

sum of geometric series: $\Sigma_{i\geq 0} x^i = 1/(1-x)$ $(0\leq x<1)$

Tip: multiply both sides by (1-x)

$\Sigma_{i\geq 1} ix^{i-1} = 1/(1-x)^2$

Tip1: slide numbered 30 in "random variables" lecture notes, or text

Tip2: if it were $\Sigma_{i\geq 1} ix^{i+1}$, say, you could convert to the above form by dividing by x^2 etc.; 1st few terms may be exceptions

integrals & derivatives of polynomials, e^x;

chain rule for derivatives; integration by parts

Good Luck!